CALFED
Water Management – Science Board
Terms of Reference

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PURPOSE:

The California Bay-Delta Authority (CBDA) has convened a standing Science Board for its suite of Water Management Programs. This Water Management Science Board (WM-SB) will provide overarching review and coordination of program strategies, plans, and specific issues of strategic importance for program elements that contribute to the CBDA Goals of Water Supply Reliability and Improved Water Quality. The elements of the Water Management Program include:

- Storage (surface[1] and groundwater storage)
- Conveyance[2]
- Water Transfers
- Water Use Efficiency (agricultural and urban water conservation and water recycling)
- Drinking Water Quality[3]
- Desalination
- Environmental Water Account[4]

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[1] Surface storage does not only include the traditional reservoirs; DWR requested the Science Program conduct a technical review of their In-Delta Storage Program. The goal of the program is to increase water supply reliability, improve operational flexibility, and allow water to be conserved during wet periods.

[2] The CALFED goal for the Delta Conveyance Program Element is to identify and implement conveyance modifications that will improve water supply reliability for in-Delta and export users, support continuous improvement in drinking water quality, and complement ecosystem restoration.

The Conveyance Program Element proposes actions to improve the pumping capabilities of State Water Project export facilities to 1) restore water project reliability and operational flexibility; (2) allow the Environmental Water Account (EWA) program to transfer and store water; (3) allow a reliable water transfer market to function; (4) allow SWP facilities to convey larger amounts of water during periods of high quality water in the Delta for urban use; and (5) provide greater capability for SWP facilities to be used to improve the reliability of Central Valley Project supplies for its water users and wildlife refuges.

[3] Safe drinking water is important to all Californians - and to the state and federal agencies that comprise the CALFED Bay-Delta Program. One of the objectives of the CALFED agencies is to ensure continuous improvements in the water quality of the Bay-Delta for all beneficial uses. The goal is to provide safe, reliable, and affordable drinking water to the 22 million Californians who rely on the Delta for all or part of their drinking water. To reach this goal, actions are being undertaken that combine cost-effective source water quality improvements, treatment technology advancements, and water management innovations.

[4] The EWA is aimed at adding flexibility to the state's water delivery system. It is designed to provide water at critical times to meet environmental needs without water supply impacts on cities, farms and businesses. The EWA gives water managers the tools to acquire, store, transfer and release water strategically to respond to real-time ecosystem needs. By providing water that otherwise would not be available, the EWA helps to resolve one of the Bay-Delta's most fundamental conflicts: the competing water needs of the environment and people.

BACKGROUND:

The California Bay-Delta Authority (CBDA) manages a cooperative effort among state and federal agencies and the public to ensure a healthy ecosystem, reliable water supplies, good quality water, and stable levees in California's Bay-Delta system. Water Supply Reliability and Improved Water Quality are two of the CBDA's fourresource management goals. The CBDA Program elements are being implemented by several state and federal agencies with oversight and coordination from the CBDA.

In its August 2000 Record of Decision (ROD), CBDA Agencies established the Science Program. Its purpose is to "provide a comprehensive framework and develop new information and scientific interpretations necessary to implement, monitor, and evaluate the success of the CBDA Program (including all program components), and to communicate to managers and the public the state of knowledge of issues critical to achieving CALFED goals."

The Science program seeks advice about approaches, relative to the state of the science, but does not necessarily seek consensus advice in that regard. Where a diversity of opinion or contradictory conclusions arises in Science Board discussions, this should be expressed in the report; where consensus occurs, that should be noted.

The ROD further recommends that individual program elements convene their own independent science boards or panels, either as standing bodies or on an as-needed basis, to "help ensure the best investments are being made and results are being achieved, as well as form strategies to reduce scientific uncertainties."

OBJECTIVES AND GUIDING PRINCIPLES:

The primary objectives of Water Supply Reliability and Water Quality Science efforts are to:

1. Support and inform sound water management decisions based on reasonable mechanisms for improving water supply reliability and water quality in an open and balanced manner.
2. Integrate Water Supply Reliability and Water Quality science activities among the Water Management Program Elements. This should include new

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The Science Program has been assigned the responsibility for a technical evaluation of the EWA in October of every year. A standing panel of distinguished scientists who have not been involved in the process has conducted these evaluations. Evaluation is defined for this purpose as exchanging information among panel, participants (EWA practitioners) and the public/stakeholders with regard to the state of the science that applies to the EWA concepts, actions and justification. The EWA standing panel has released a summary report for 2001, 2002 and has recently released their evaluation f or the 2003 water year.

construction, infrastructure repair, water delivery and use efficiency, and conservation for both agricultural and urban water users.

3. Provide integrated Water Supply Reliability and Water Quality scientific insights to other CBDA Program Elements where appropriate.
4. Evaluate relative water management costs and benefits.
5. Consider behavioral implications of proposed Water Management actions.
6. Verify results of water management actions.
7. Provide scientific insights for monitoring and the development of performance measures for the Water Management Program and its elements.
8. Foster appropriate adaptive management measures.

The WM-SB is expected to play an instrumental role in guiding these efforts.

In carrying out its work, the WM-SB will seek to better understand the various causalities – physical, behavioral, institutional, economic, biological and chemical – expected to impact water management implementation. This will necessitate a likely focus on the following types of Water Management Program issues:

- Methods for monitoring, data collection, and data analysis
- Results of monitoring
- Research priorities
- Past and projected performance measures[5]
- Water management costs and benefits
- Proposal Solicitation Process criteria and scientific review
- Strategies and scope of CALSIM modeling efforts
- Integration within the Water Management Program and with the CBDA's broader program
- Program design, implementation strategies, and relevance to stakeholder communities
- Considerations related to changing climate and the incidence of more extreme weather events
- New insights gained as a result of considering drinking water health-related issues
- Managing the risks associated with uncertainties and ways to improve decision making and evaluation of risk
- Other issues as identified by the WS-SB or CBDA staff

This WM-SB – which convenes in January 2005 – shall be guided by several key principles:

[5] Performance measures represent estimates of costs and benefits (e.g. volume of sustainable groundwater yield), including past performance (post-ROD) and projections of likely future performance.

- **Advice/review-focused.** As is the case for the CBDA Science Program Independent Science Board (ISB), the WM-SB will not be directly involved in making policy or funding decisions. Rather, its function will be to advise/review ongoing and proposed water management activities. It will work to ensure that water management activities incorporate the best available knowledge into decision process both in terms of how to physically carry them out and the relationships with the socioeconomic and ecological environments. It will also work toward narrowing scientific uncertainties, advancing the application of better knowledge, and forwarding the debate.

- **Water Management Program-wide science integration.** The development of applicable and sound science to support and guide CBDA activities will require effective coordination and integration of scientific activities among the various Water Management Program Elements and collaboration with the other CBDA Program elements.

- **Open process with stakeholder involvement.** The ROD calls for science activities to be conducted in an open and collaborative manner to allow and encourage involvement of and input from stakeholder and academic science communities. Consequently, the deliberations of the full WM-SB will be conducted primarily in public[6]. Additionally, CBDA-convened stakeholder groups representing diverse agricultural, urban, environmental and agency interests have served as sounding boards regarding WM-SB design, and recruitment. They will continue to provide advice regarding the intended outcomes of the Board's deliberations.

- **Balance and neutrality in Board recruitment.** The WM-SB – like all CBDA standing science boards or panels – has strived for balance between local and outside knowledge, relevant disciplines, academic/private sector/regulatory agency scientists, gender, and ethnicity. Scientists with perceived attachments to stakeholder groups or regulatory activities in the regulatory agencies were not, *a priori,* excluded from the Board. But any individual with such perceived connections must have had an exceptional reputation for maintaining a balanced view in order to be chosen (i.e., seen as an open-minded expert with a proven track-record of integrating others' perspectives).

- **Legitimacy and accountability.** To ensure that WM-SB activities are credible and result in advice useful to the CBDA and accepted by stakeholders, it is essential that the Board's composition and work be structured to foster

[6] From time to time, the WM-SB may opt to hold Board-only sidebars. In such cases, the results of Board deliberations will be reported out to the public.

legitimacy, accountability and neutrality. Accordingly, the Board membership selection process and operating procedures below incorporate key elements – hold deliberations in public and invite meaningful stakeholder involvement, establish criteria to guide the selection of any new Board members, Consultative Panel members and /or Resource experts – that are intended to facilitate such an atmosphere.

- **Programmatic-Area Standing Panels.** Given the large number of CBDA Water Management Program elements, the WM-SB, with the concurrence of CBDA staff, will establish Programmatic-Area Standing Panels to provide focused assessments for individual elements (such as the Drinking Water Quality and Water Use Efficiency Programs). The Chair of such a Standing Panel will be a member of the WM-SB (or her/his designee), and 1 to 3 additional Board members will serve on it.

  The Standing Panel Chair or the WM-SB will also select 2 to 4 Consultative members to serve on each Standing Panel from outside of the WM-SB. These Consultative members will be selected for their expertise and the perspective they can bring to the specific subjects under consideration even if they may be considered to be advocates of positions that are strongly aligned with particular stakeholder groups or agencies. However, they must be able and willing to work as congenial team players. Finally, the Standing Panel Chair or the WM-SB will also select up to 4 additional Resource experts to participate in Standing Panel Meetings in a more ad hoc fashion.

- **Issue-Specific Task Forces.** From time to time, the WM-SB, with the concurrence of CBDA staff, may convene temporary Issue-Specific Task Forces to provide in-depth assessments of particular facets of CBDA's Water Management Program. The Chair of such a Task Force will be a member of the WM-SB (or her/his designee), and 1 to 2 additional Board members will serve on it. The Standing Panel Chair or the WM-SB will also select 2 to 4 Resource experts to serve on the Task Force. The members of such Task Forces will be selected by the WM-SB for their expertise and the perspective they can bring to the subject even if they may be considered to be advocates of positions that are strongly aligned with particular stakeholder groups or agencies. However, they must be able and willing to work as congenial team players.

WM-SB SCOPE OF WORK:

WM-SB Scope of Work

The scope of work assigned to or undertaken by the WM-SB members individually or collectively will include:

1. Bring detailed expertise to bear on scientific issues of concern to the CBDA Water Supply Reliability and Water Quality activities. This may include:
    a. Identifying and prioritizing critical issues;
    b. Proposing and participating in workshops on critical subjects; working with the Authority staff to help identify critical strategic questions and cross-program linkages;
    c. Proposing subjects for white papers, reviews, or studies that are critical to CBDA's Water Supply Reliability and Water Quality goals; and
    d. Establishing /reviewing criteria for the scientific review of the Proposal Solicitation Packages[7] for the various Water Management Program Elements.

2. Assist in assembling and participating in Programmatic-Area Standing Panels and Issue-Specific Task Forces to support WM-SB deliberations. Such Issue-Specific Task Forces might focus more narrowly on issues such as evaluating In-Delta storage or desalinization. The intent is to fully use the WM-SB, as necessary, as a source of independent advice on specific technical questions that arise as water management research and monitoring aspects evolve.

3. Coordinate with the CBDA Science Program and other CBDA Program Science Boards or panels on issues involving cross-program linkages, such as ongoing scientific review of the CALSIM II model and alternate scenarios or models for analyzing reliability.

4. Review (or obtain reviews for) documents, proposals describing major Water Supply Reliability and Water Quality initiatives, the annual planning process for specific actions, and performance evaluation.

5. Analyze existing data related to specific actions or programs, as relevant to reviews or advising described above. Where not in conflict with consulting roles, recommend studies relevant to accomplishing the CBDA's Water Supply Reliability and Water Quality goals.

6. Analyze stakeholder responses to Water Supply Reliability and Water Quality initiatives.

[7] Many CALFED programs conduct competitive processes for selecting proposals. Embedding peer review is a critical component of these processes for which the Science Program (and the WM-SB) has oversight responsibility. The goal is to establish and maintain funding processes that applicants can be sure is fair, and to select only proposals that are both good ideas and have a high likelihood of success.

The Board's work products are to reflect its independent scientific judgment. To the extent that CBDA uses or alters work products, there will be clear identification as to their administrative or independent status.

WM-SB Communications Protocols

The communications protocols for the WM-SB members individually or collectively should be consistent with the following the following guidelines:

1. Questions will be posed to the WM-SB via a written program of work and supplementary memoranda. The WM-SB will respond with written statements. The WM-SB may be contacted directly, or via the designee of the Deputy Director for Water Management. Each party will inform the other of such contacts. The WM-SB will respond with written statements.

2. The WM-SB's formal contacts with agencies, stakeholders and the public will be via procedures established by CBDA to ensure fair and open access to the all WM Programs and their work products.

3. Ex-Parte Contacts. As scientists, WM-SB members will naturally be in contact with academics and agency scientists, some of whom may seek support from CBDA. Members should be aware of the need to treat all parties fairly and not benefit any one party with information pertaining to the work or pending recommendations of the WM-SB. Direct communication with staff of constituent agencies or with those seeking CBDA funding shall be minimized, in favor of more open and formal discussion at public sessions of the WM-SB, or routing of communication through the WM Program designee.

The WM-SB will report to the Authority's Deputy Director for Water Management. Similarly, all Board work products will be directed to the Deputy Director for Water Management, for subsequent distribution to the appropriate bodies.

WM-SB ORGANIZATION:

WM-SB Size and Areas of Expertise

Sixteen nationally and/or internationally recognized experts[8] specializing in one or more of the following primary areas have been recruited to serve on the WM-SB:

1. Agricultural water management
2. Urban water conservation
3. Aquatic ecology
4. Aquatic chemistry, toxicology and microbiology
5. Water quality and drinking water treatment
6. Environmental economics (tradeoffs among alternative uses)
7. Resource economics
8. Water recycling and desalination
9. Groundwater hydrology
10. Surface water hydrology and storage
11. Water conveyance through constructed and natural flow systems
12. Water resources and river basin modeling
13. Water policy and analysis
14. Water management/ecosystem restoration interaction
15. Social geography (environment, water, place and space), and
16. Organizational/behavioral dynamics.

The fully constituted Board is expected to be familiar with and able to integrate issues related to water supply reliability, water quality and ecosystem restoration.

The WM-SB includes a Chairperson. The Chair is responsible for working with the Authority's Deputy Director for Water Management and other staff/consultants to prioritize Board work, identify needed resources, co-facilitate meetings and ensure the WM-SB stays focused and meets deadlines. The Chair also will take the lead in coordinating with the CBDA Science Program and its Independent Science Board (ISB) and other CBDA Program element review boards or panels. Finally, the Chair will work with the Authority to determine what Programmatic-Area Standing Panels to convene and when it is necessary to establish and convene Issue-Specific Task Forces to support the broader WM-SB deliberations.

WM-SB Selection Process and Criteria

[8] These experts will collectively provide scientific and technical expertise in the following disciplines: engineering; urban/agricultural water conservation practices; surface- and ground-water hydrology; hydraulics; water treatment and recycling; biology, chemistry and physical science; aquatic chemistry and ecological functions; statistical analysis; public policy; water transfers; drinking and agricultural water quality; organizational/behavioral dynamics; social justice issues and public outreach/marketing.

Authority staff/consultants have coordinated with the CBDA Science Program and its ISB, other CBDA agencies, and stakeholders to establish selection criteria for and recruit sixteen independent scientists to serve on the WM-SB. Names of potential board members were solicited from the Water Supply, Water Use Efficiency Drinking Water Quality and Environmental Justice Subcommittees, the CBDA Science Program and its ISB, and other interested CBDA Agency staff and stakeholders. After reviewing the match between the selection criteria and the nominated candidates, CBDA management staff prepared a "short list" with the aim of proposing at least two candidates for each of the sixteen positions. The short list was further reviewed with the Water Use Efficiency, Water Supply, Drinking Water Quality, and Environmental Justice Subcommittees and their feedback was carefully considered. The final list of candidates was reviewed and approved by CBDA's Director, Deputy Director for Water Management, Lead Scientist, and Independent Science Board.

Of the sixteen WM-SB members on the initial Board, five also hold appointments as standing members on the CBDA Independent Science Board, and one of these five is on the Ecosystem Restoration Science Board and another is on the Environmental Water Account Review Panel.

The criteria used in selecting qualified WM-SB members (both for the initial sixteen members and any future additional or replacement members) is that they must have (1) appropriate scientific expertise, (2) a mix of academic and practical, on-the-ground experience and credentials, (3) the capability to accomplish stated duties, and (4) met the required selection criteria. These selection criteria included all or part of the following:

- Extensive knowledge of the Bay-Delta watershed and Bay-Delta watershed and drinking water quality issues;
- Stature in the broad scientific community (as evidenced by invited talks, history of workshop participation, history of scientific leadership such as organizing sessions or conferences);
- A record of publication in peer reviewed scientific literature in the area of expertise identified;
- Experience managing environmental or water quality issues or advising senior agency managers and fostering the use of science in water management;
- Ability to weigh and articulate issues in a balanced, objective manner, as reflected in the perceived willingness/ability to integrate diverse viewpoints;
- Ability to work collaboratively and work and think across disciplines; and
- Availability throughout the duration of the appointment.

The WM-SB Chairperson, in addition to meeting the above criteria, must have a demonstrated ability to lead complex, independent science panels and foster integration across disciplines and programs.

Each WM-SB member has been ask to serve for a term of at least two years and up to six years with the possibility of re-appointment. Term ending dates will be staggered to avoid gaps in institutional memory.

WM-SB Procedures:

The initial sixteen candidates were invited and agreed to serve on WM-SB in October 2004. The first WM-SB meeting is scheduled for January 26 and 27, 2005 and the Board will meet up to two times a year thereafter. Initially four Programmatic-Area Standing Panels will be convened. These Panels will meet two to three times per year. Approximately two Issue-Specific Task Force meetings will also be convened each year. WM-SB members are expected to attend an average of two Standing Panel and/or Task Force meetings per year in addition to up to two full WM-SB meetings. Full WM-SB meetings will each last 2 days. Standing Panel and Task Force meetings will last 1-2 days, as appropriate.

The full scope of WM-SB meetings is anticipated to include several formats, including from one to all of the following four types of sessions:

- **Open meetings** with structured opportunities for public comments;
- **Open work sessions** in which the WM-SB may interact with invitees (observers and representatives of agencies and stakeholders);
- **Work sessions** of the WM-SB and CBDA and implementing agency staff; and
- **In-camera sessions** that will be limited to issues of personnel and board-staff relations.

Summaries of the first three types of meetings will be made available to the public and the general nature of in-camera discussions will be reported in open meeting.

The Deputy Director for Water Management, in consultation with appropriate Authority staff and stakeholder groups, has named Jack Keller as the Interim Chair to serve in that capacity for the first year. After the first year, the Chairperson will be selected from among and by the Board members and will serve a two-year term.

The WM-SB is expected to meet at least through Stage 1. The CBDA will periodically assess the Board's focus and work during Stage 1 to ensure the deliberations are effective and appropriate. Any changes in focus, composition, or WM-SB duration will be discussed with the appropriate stakeholder and decision-making bodies.

Board, Standing Panel, and Task Force members will be reimbursed for direct expenses related to their participation. The CBDA shall also provide stipends for their participation.

WM-SB Conflict of Interest Issues

To preserve the capacity to provide critical, independent evaluation of programs run by CBDA, board members should not become directly engaged in activities that might conflict with the WM-SB role as an independent scientific oversight body. On occasion, it may be possible that individual or sub-sets of WM-SB members assigned to work closely with CBDA staff and the staff of implementing agencies may become so engaged that they cannot serve in an independent review capacity on that topic. In this case or if deliberations of the WM-SB place a member in a real or perceived conflict of interest situation, members should openly note the potential conflict and consider excusing themselves from the discussion.

As noted under the section on communication protocols, WM-SB members will naturally be in contact with other scientists whom may seek support from CBDA. They should be aware of the need to treat all parties fairly and not benefit any one party with information pertaining to the work or pending recommendations of the WM-SB. Direct communication with staff of constituent agencies or with those seeking CBDA funding should be minimized, in favor of more open and formal routing of communications through the office of the Deputy Director for Water Management.

WM-SB MANAGEMENT, FACILITATION AND PUBLIC INVOLVEMENT

The CBDA is responsible for convening the WM-SB. The Deputy Director for Water Management, in his/her oversight and coordination capacity, is directly responsible for guiding the Board's activities. This includes working with the Board's Chairperson and members to identify issues needing WM-SB input; prioritizing Board activities; providing the appropriate resources to support the Board's deliberations; and regularly updating Program Plans and the Board's work plan to adapt to WM-SB findings and recommendations.

The CBDA has engaged the services of CONCUR, Inc. to assist the Chairperson in facilitating the WM-SB's deliberations. Facilitation activities will include planning an integrated series of meetings and preparatory activities; ensuring efficient and complete information flow between Board members, the Water Supply, Water Use Efficiency, Drinking Water Quality, and Environmental Justice Subcommittees, CBDA staff and implementation agencies; development of meeting agendas and pre-meeting documents; summarizing meeting outcomes and public comments; assisting the WM-

SB in developing draft and final documents that sum up the advice of the WM-SB; and supporting briefings on the results of the WM-SB's deliberations.

A broad range of stakeholders and other interested parties will be invited by the CBDA to observe WM-SB deliberations. The public will have periodic opportunities to address the Board. The staff members of other agencies such as the Department of Water Resources, the Natural Resources Conservation Service, the State Water Resources Control Board, the U.S. Environmental Protection Agency, and the U.S. Bureau of Reclamation are also expected to actively participate in WM-SB meetings.